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10/525,297	02/15/2005	James S. Im	A35413-PCT-USA (070050.27	6004

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EXAMINER	
AU, BAC H	

ART UNIT	PAPER NUMBER
2822	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/525,297	IM, JAMES S.	
	Examiner	Art Unit	
	Bac H. Au	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) *17-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 February 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9 April 2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on February 11, 2008, in which claim 1 was amended, has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the width" in lines 15-16. It is unclear which width is being recited.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugano (U.S. Pub. 2002/0096680) in view of Ito (U.S. Pub.2002/0104750) and Maegawa (U.S. Pat. 5591668).

Regarding claim 1, Sugano [Figs.1-7] discloses a method for processing a thin film sample, comprising the steps of:

(a) controlling a beam generator [51] to emit at least one beam pulse;

(b) masking the at least one beam pulse to produce at least one masked beam pulse, wherein the at least one masked beam pulse is used to irradiate at least one portion [RGN] of the thin film sample;

(c) with the at least one masked beam pulse, irradiating the at least one portion of the film sample with sufficient intensity for the at least one portion to later crystallize [Paras.11,59]; and

(d) allowing the at least one portion [RGN] of the film sample to crystallize, the crystallized at least one portion being composed of a first area [Edge portion] and a second area [Center portion],

wherein the first area surrounds the second area, and is configured to allow an active region of an electronic device to be provided at a distance therefrom [Paras.11-13,59].

Sugano discloses an irradiated and crystallized region [RGN], which would obviously include an edge region and a center region, but fails to explicitly disclose wherein, upon the crystallization thereof, the first area includes a first set of grains, and the second area includes a second set of grains whose at least one characteristic is different from at least one characteristic of the first set of grains.

However, Ito [Fig.23] and Maegawa [Figs.1A-B] disclose a method for processing a thin film sample, wherein, upon the crystallization thereof, the first area [Edge portion]

includes a first set of grains, and the second area [Center portion] includes a second set of grains whose at least one characteristic is different from at least one characteristic of the first set of grains.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Ito and Maegawa into the method of Sugano. The ordinary artisan would have been motivated to modify Sugano in the manner set forth above for at least the purpose of facilitating the provision of the edge and center portions of the irradiated region [RGN] as disclosed by Sugano.

Sugano fails to explicitly disclose wherein the first and second areas are sized such that the width of the first area is at least ten times smaller than the width of the second area. However, Sugano [Paras.8-10] discloses the edge or boundary portions (first area) to be problem areas where transistor performance is deteriorated due to the film quality in those areas. Similarly, Maegawa [Figs.1A-B] discloses the lower crystallinity of the edge portion compared to that of the more desirable center portion with respect to device performance. The first area and the second area disclosed by Sugano would inherently have a width of some dimension, and their relative widths would vary depending on the size and shape of the irradiated region [Paras.12-13]. Therefore, it would have been obvious through routine experimentation and optimization to provide the claimed limitation of the relative widths for the purpose of minimizing or eliminating the edge portions to insure high device performance.

Regarding claims 2-3, Sugano [Paras.90-93; Figs.21-23] discloses

wherein the masked beam pulse has the intensity to completely melt the at least one portion of the thin film sample throughout its thickness;

wherein the masked beam pulse has the intensity to partially melt the at least one portion of the thin film sample.

Regarding claims 4-12, and 15-16, Sugano discloses

wherein the active region of the TFT is situated within the second area [Paras.11-13,59];

wherein the second area corresponds to at least one pixel [Paras.11-13,59];

wherein the second area has a cross-section for facilitating thereon all portions of the TFT [Paras.11-13,59];

wherein a size and a position of the first area with respect to the second area are provided such that the first area provides either no effect or a negligible effect on a performance of the TFT [Paras.11-13,59];

further comprising the step of: (e) after step (d), determining a location of the first area so as to avoid a placement of the active region of the TFT thereon [Paras.11-13,59];

wherein the at least one beam pulse includes a plurality of beamlets, and wherein the first and second areas are irradiated by the beamlets [Paras.11-13,59-62];

wherein the thin film sample is a silicon thin film sample [Paras.11-13,59];

wherein the thin film sample is composed of at least one of silicon and germanium [Paras.11-13,59];

wherein the thin film sample has a thickness approximately between 100Å and 10,000Å [Para.65 lines 13-16];

wherein the electronic device is a thin-film transistor ("TFT") [Paras.11-13,59];

wherein the thin film sample is a semiconductor thin film sample [Paras.11-13,59].

Regarding claims 13-14, Sugano does not explicitly disclose wherein the first set of grains provided in the first area are laterally-grown grains; and wherein the laterally-grown grains of the first area are equiaxed grains. However, it would be obvious that the first set of grains provided in the first area, boundary or edge portion, are laterally-grown grains; and wherein the laterally-grown grains of the first area are equiaxed grains. This is because lateral crystal growth occurs at the liquid/solid boundary region and propagates perpendicular to the boundary. It would also be obvious that the laterally-grown grains of the first area are equiaxed grains, as the crystallization process of the melted region would proceed similarly to that of the claimed invention. The lateral grain growth effect is disclosed in the Experiments section, on p.2, of Jeon et al., “Two-step laser recrystallization of poly-Si for effective control of grain boundaries”.

Response to Arguments

4. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant asserts that there would not be any reasonable expectation of success in combining Sugano with either, or both, of Ito and Maegawa, and that there is no suggestion to combine the references because of the different approach to producing a uniform crystalline structure. Theses assertions are not persuasive. Ito and Maegawa were not necessarily relied on in the rejection for this disclosure. All three references teach methods of laser crystallization of films. As discussed above, the irradiated region of Sugano [RGN] would inherently include an edge portion surrounding a central portion. Ito and Maegawa were cited to explicitly disclose the grain characteristics of the two different portions, as already addressed above.

Overall, Applicant's arguments are not persuasive. The claims stand rejected and the Action is made Final.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bac H. Au whose telephone number is 571-272-8795. The examiner can normally be reached on Mon-Fri 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Zandra V. Smith/
Supervisory Patent Examiner, Art Unit 2822

/B. H. A./
Examiner, Art Unit 2822